Tanta University

Department: Computers and Control Engineering
Total Marks: 60 Marks

Faculty of Engineering

Course Title: Computer Programming1
Date: 12.01.2015 (Final Exam)

Course Code: CCE1103 - 1st year Students
Allowed time: 3 hours

Answer the following three questions: (20 marks)

Question 1:

1. *"There are two major types of programming languages: low-level languages and high-level languages"*. Show the **difference** between these languages supporting your answer with the **advantages** and **disadvantages** for each?
2. Write a C^{++} **program** to print the **student's grades** according to their **marks (K)** as shown in the following table:

Student Marks	Grade
50>K	Fail
50≤K<65	Pass
65≤K<75	Good
75≤K<85	Very Good
85≤K≤100	Excellent

the marks are entered during run time?

3. **Choose the correct answer:**
   a. **Which of the following is a valid assignment statements?**
      i. total = 9; ii. 72=amount; iii. Degree=34 iv. Letter='S;
   b. **How many return values may a function have?**
      i. at most one ii. Two iii. No return iv. Equal to the number of parameters
   c. **The result of ceil(4.5) is:**
      i. 4 ii. 5 iii. 45 iv. 9
   d. **Every C++ program must have a:**
      i. *cout* statement. ii. function ***main***. iii. //include statement. iv. All are true.
   e. **Every complete C++ statement ends with:**
      i. Period (.) ii. # symbol iii. Semicolon (;) iv. Return 0 statement

Question 2: (20 marks)

1. State which of the following are **true** and which are **false**. **If false, explain why:**

a) **cin** requires the user to press the [Enter] key **twice** when finished entering data.
b) **A function** can call itself, but it can not call other functions.
c) You can use any **Geometric shape** to represent algorithms when drawing flowcharts.
d) In a **value-returning function**, the return statement can be used to return a value from this function to the point of call of this function.
e) The header file that must be included in programs using **strcpy( )** function is **C-strings**.
f) Function **prototype** causes the function to be executed.
g) When an **if statement** is nested in the **if part** of another statement, the only time the **inner if** is executed is when the expression of the **outer if** is **false**.
h) The **rectangle symbol** represents only one processing operation.
i) The = operator and the == operator perform the same operation.
j) **A group of statements**, such as the contents of a function, are enclosed in parenthesis ( ).

2. Write an algorithm and draw a flowchart to get the temperature degree from the user, and print out the following results "greater than zero"- "less than zero"-"equal to zero"?

3. Write the outputs from the following two C++ programs:

1.
```
#include <iostream.h>
int Go(int n)
{
   if (n<1) return 0;
   else if (n==1) return 1;
   else return 2*Go(n-1);
}

int main( )
{
cout << Go(-5)<< endl;
cout << Go(1)<< endl;
cout << Go(2)<< endl;
cout << Go(3)<< endl;
cout << Go(4)<< endl;
return 0;
}
```

2.
```
#include <iostream.h>
#include <string.h>
void main( )
{
string Dept = "Computer";
string Faculty = "Engineering";
string City= "Tanta";
strcat(Dept,Faculty);
cout << Dept << "is the best in
"<<City<<endl;
cout << strlen(Dept) << endl;
strcpy(Faculty,"Computer Sceince");
cout << Faculty << endl;

if (strcmp(Faculty,Dept)>0)
cout<<"This faculty wins"<<endl;
cout<<"This faculty losses"<<endl;
}
```

Question 3: (20 marks)

1. Write overloaded versions of a Max function which compares two integers, two reals, or two strings, and returns the 'larger' one?
2. Assume you have an array of integers, called MyArray, with the following values (77, 99, 44, 55, 22, 33). Write a complete C++ program that provides the following functions with the given array:
   a. Function, *Find ( )*, that can check if a given item is in the array or not.
   b. Function, *Avg( )*, that can return the average value of the array elements.
   c. Function, *Display( )*, that can display the contents of the array.
3. Rewrite the following C++ programs after correcting the errors (each has 5 errors):

1.
```
#include<iostream;h>
float Area(float r);
void main( );
{
float rad, circle;
cout<<"Enter the circle radius: ";
cin>>rad;
circle = Area(r);
cout>>"The circle area is:
"<<circle;
}
float Area(float r)
{
   return 3.14*r*r
}
```

2.
```
#include<iostream.h>
void product(int x, int y, int z);
{
    return x*y*z;
}
void main( )
{
int n1,n2,n3,A;
cout<"Enter three numbers to multiply: ";
cin>>n1>>n2>>n3;
A=product(n1, n2; n3);
cout<<"The result is : "<<A<<end;
}
```

With my best wishes,
Dr. Dina M. Ibrahim

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The Answer Model

Question 1: (20 marks)

1. *"There are two major types of programming languages: low-level languages and high-level languages"*. Show the **difference** between these languages supporting your answer with the **advantages** and **disadvantages** for each?

The Answer:

There are two major types of programming languages:

1. Low Level Languages: The term low level means closeness to the way in which the machine has been built.

(a) Machine Language: is the only language that is directly understood by the computer. It does not need any translator program. We also call it machine code and it is written as strings of 1's and 0's.

Advantage

The only advantage of writing the program is that program runs very fast because no translation program is required for the CPU.

Disadvantages

1. It is very difficult to program in machine language. The programmer has to know details of hardware to write program.
2. The programmer has to remember a lot of codes to write a program which results in program errors.
3. It is difficult to debug the program.

(b) Assembly Language: It is the first step to improve the programming structure. Computer can handle numbers and letters. Therefore some combination of letters can be used to substitute for number of machine codes.

Advantages:

1. The symbolic programming of Assembly Language is easier to understand and saves a lot of time and effort of the programmer than the machine language programming.
2. It is easier to correct errors and modify program instructions than the machine language.
3. the same efficiency of execution as machine level language. Because this is one-to-one translator.

Disadvantages:

One of the major disadvantages is that assembly language is machine dependent. A program written for one computer might not run in other computers with different hardware configuration.

2. High level languages: You know that assembly language and machine level language require deep knowledge of computer hardware where as in higher language you have to know only the instructions in English words and logic of the problem irrespective of the type of computer you are using.

Thus **a problem** oriented language designed in such a way that its instruction may be written more like the language of the problem.

Advantages:

Higher level programming languages have a major advantage over machine and assembly languages that higher level languages are easy to learn and use.

2. Write a **C++ program** to print the **student's grades** according to their **marks (K)** as shown in the following table:

Student Marks	Grade
50>K	Fail
50≤K<65	Pass
65≤K<75	Good
75≤K<85	Very Good
85≤K≤100	Excellent

the marks are entered during run time?

The Answer:

```
#include <iostream>
using namespace std;
void main (void)
{
float K;
cout<<"Enter Degree ";
cin>>K;
if(K>=85) return "Excellect";
else if(K>=75) cout<<"Very Good";
else if(K>=65) cout<<"Good";
else if(K>=50) cout<<"Pass";
else cout<<"Fail";
}
```

3. **Choose the correct answer:**

   a. **Which of the following is a valid assignment statements?**
   i. **total = 9;** ii. 72=amount; iii. Degree=34 iv. Letter='S;

   b. **How many return values may a function have?**
   i. **at most one** ii. Two iii. No return iv. Equal to the number of paramet

   c. **The result of ceil(4.5) is:**
   i. 4 **ii. 5** iii. 45 iv. 9

   d. **Every C++ program must have a:**
   i. *cout* statement. **ii. function *main*.** iii. //include statement. iv. All are true.

   e. **Every complete C++ statement ends with:**
   i. Period (.) ii. # symbol **iii. Semicolon (;)** iv. Return 0 statement

Question 2: (20 mark

1. State which of the following are **true** and which are **false. If false, explain why:**

a) **cin** requires the user to press the [Enter] key **twice** when finished entering data (×)
True:cin requires the user to press the [Enter] key **once** when finished entering data.

b) **A function** can call itself, but it can not call other functions (×)
True:A function can call itself, and it can call other functions.

c) You can use any **Geometric shape** to represent algorithms when drawing flowcharts
True: You can use standard **Geometric shape** to represent algorithms when drawing flowcha

d) In a **value-returning function**, the return statement can be used to return a value f this function to the point of call of this function (√)

e) The header file that must be included in programs using **strcpy( )** function is **C-str** (×)

f) Function **prototype** causes the function to be executed (✕)
True: Function **call** causes the function to be executed

g) When an **if statement** is nested in the **if part** of another statement, the only time the **inner if** is executed is when the expression of the **outer if** is **false** (✕)
True: When an **if statement** is nested in the **if part** of another statement, the only time the **inner if** is executed is when the expression of the **outer if** is **true**

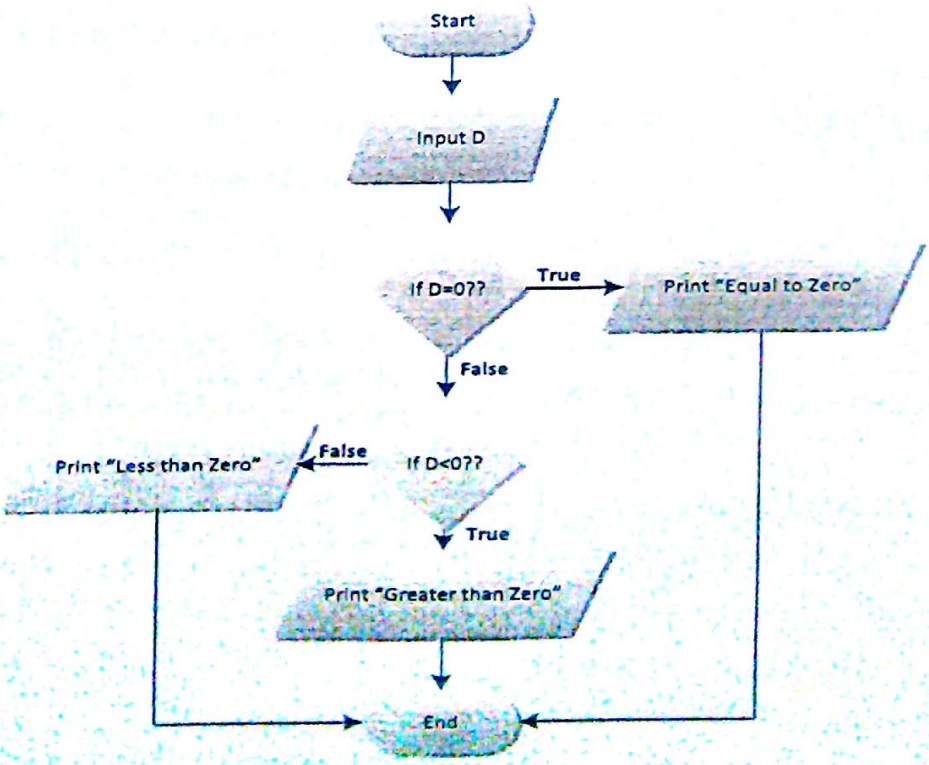
h) The **rectangle symbol** represents only one processing operation (✕)
True: The **rectangle symbol** represents one or more processing operation

i) The = operator and the == operator perform the same operation (✕)
True: The = operator and the == operator perform not the same operation

j) **A group of statements**, such as the contents of a function, are enclosed in parenthesis( ) (✕)
True: **A group of statements**, such as the contents of a function, are enclosed in braces{ }

2. **Write** an algorithm and **draw** a flowchart to get the temperature degree from the user, and print out the following results **"greater than zero"- "less than zero"-"equal to zero"?**

The Answer:



3. Write the outputs from the following two C++ programs:

1.
```
#include <iostream.h>
int Go(int n)
{
    if (n<1) return 0;
    else if (n==1) return 1;
    else return 2*Go(n-1);
}

int main( )
{
cout << Go(-5)<< endl;
cout << Go(1)<< endl;
cout << Go(2)<< endl;
cout << Go(3)<< endl;
cout << Go(4)<< endl;
return 0;
}
```

The Answer:

0
1
2
4
8

2.
```
#include <iostream.h>
#include <string.h>
void main( )
{
string Dept = "Computer";
string Faculty = "Engineering";
string City= "Tanta";
strcat(Dept,Faculty);
cout << Dept << "is the best in
"<<City<<endl;
cout << strlen(Dept) << endl;
strcpy(Faculty,"Computer Sceince");
cout << Faculty << endl;

if (strcmp(Faculty,Dept)>0)
cout<<"This faculty wins"<<endl;
cout<<"This faculty losses"<<endl;
}
```

The Answer:

ComputerEngineering is the best in Tanta
19
Computer Sceince
This faculty wins
This faculty losses

Question 3: (20 marks)

1. Write overloaded versions of a **Max** function which compares **two integers**, **two reals**, or **two strings**, and returns the **'larger'** one?

The Answer:

```
int Max (int x, int y)
{       if (x>y) return x;
        else return y;
}
float Max (float x, float y)
{       if (x>y) return x;
        else return y;
}
string Max (string x, string y)
{       if (srtcmp(x,y)>0) return x;
        else return y;
}
```

2. Assume you have an array of integers, called **MyArray**, with the following values (77, 99, 44, 55, 22, 33) Write a complete C++ program that provides the following functions with the given array:
   a. Function, *Find ( )*, that can check if a given item is in the array or not.
   b. Function, *Avg( )*, that can return the average value of the array elements.
   c. Function, *Display( )*, that can display the contents of the array.

The Answer:

```
# include <iostream.h>
int Find(int x[], int m)
{
for(int i=1;i<length;i++)
{
if(x[i]=m)
return m;
}

int Avg(int x[], int len)
{
int n, result=0, avg;
  for ( n=0 ; n<len ; ++n )
  {
    result += x[n];
  }
Avg=result/len;
return Avg;
}

void Display(int x[],int length)
{
for(int i=0;i<length;i++)
{
cout<<x[i]<<endl;
}
}

void main()
{
int MyArray[6]={77,99,44,55,22,33};
cout<<"Get the number 44 from the array:"<<Find(MyArray,44);
cout<<"The Average values of the array is:"<<Avg(MyArray,6);
Display(MyArray,6);
}
```

3. Rewrite the following C++ programs after correcting the errors (each has 5 errors) (5 marks)

1.
```
#include<iostream;h> // dot ,
float Area(float r);
void main( );// not written
{
float rad, circle;
cout<<"Enter the circle radius: ";
cin>>rad;
circle = Area(r); // rad
cout>>"The circle area is: "<<circle;
// <<
}
float Area(float r)
{
  return 3.14*r*r ; // must written
}
```

2.
```
#include<iostream.h>
void product(int x, int y, int z); // int not void
and not written ;
{
    return x*y*z;
}
void main( )
{
int n1,n2,n3,A;
cout<"Enter three numbers to multiply: "; // <<
cin>>n1>>n2>>n3;
A=product(n1, n2; n3);  // , not ;
cout<<"The result is : "<<A<<endl;  // endl
}
```

With my best wishes,
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